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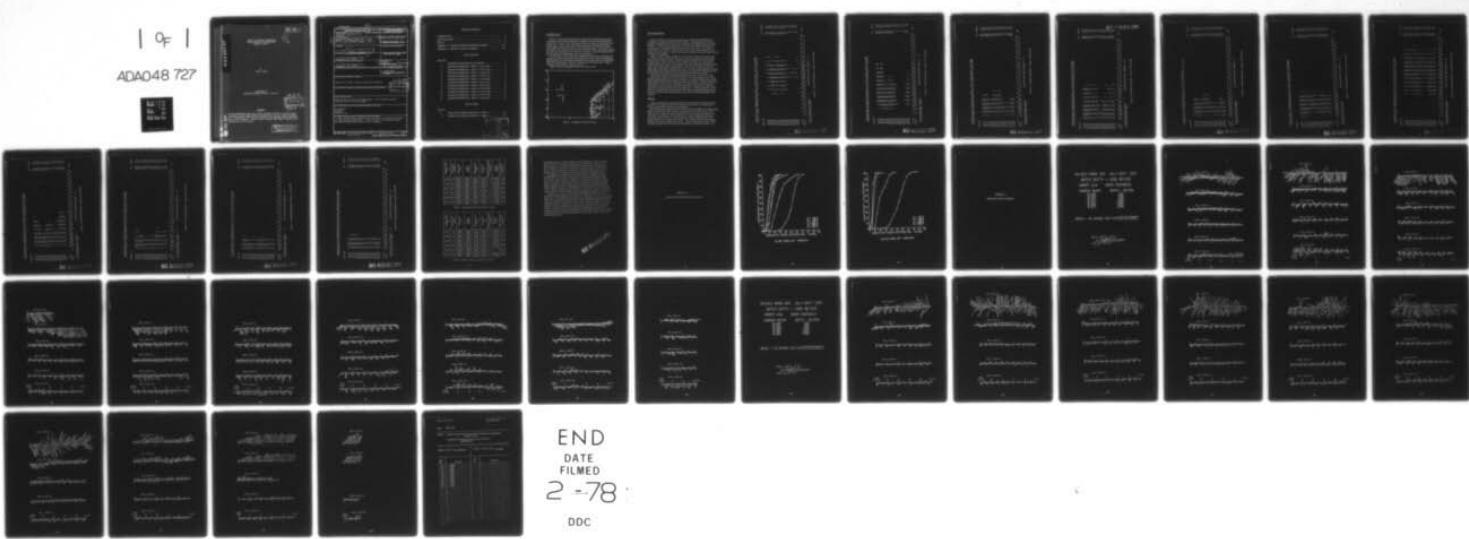
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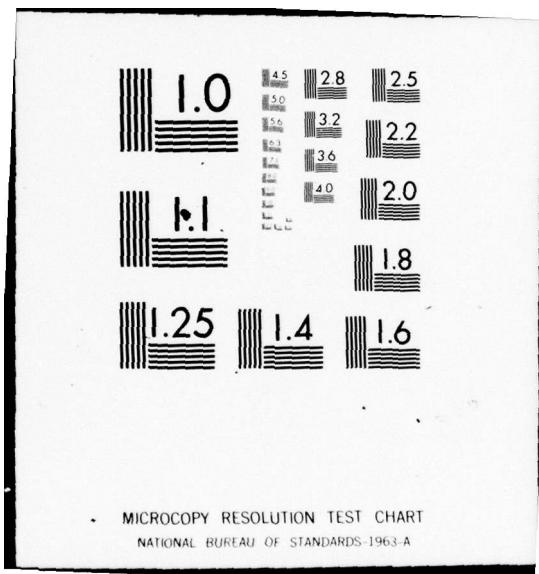
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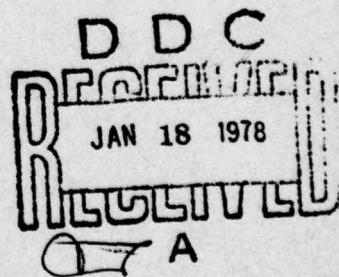
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RESULTS OF CURRENT OBSERVATIONS
WILKES NORWEGIAN SEA OPERATIONS
(ARRAYS 1 AND 2)

BY
OTIS R. SMITH

SUPPLEMENT TO
NAVOCEANO TECHNICAL NOTE NO. 6110-2-75



ABSTRACT

Current measurements were made in four separate locations at various depths in support of the WILKES Norwegian Sea Operations in July through September 1974. Measurements from the two locations in the Southern part of the Norwegian Sea are discussed. Speeds at both locations were high to moderate with maximum values of 90 cm/sec.

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Gives current data collected at two locations in the southern Norwegian Sea July through September 1974. Data are reported in cumulative speed distribution graphs and graphs of vector averages.		

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SEARCHED	INDEXED	SERIALIZED	FILED
BY	DATE	BY	DATE
JULY 1968			
DISTRIBUTION AVAILABILITY CODES			
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INTRODUCTION

The U.S. Naval Oceanographic Office implanted four tautlined arrays of self-contained current measuring instruments in support of Exercise WILKES-NORWAY, in July 1974. Arrays 1 and 2 will be discussed; Arrays 3 and 4 were discussed in an earlier report. Arrays 1 and 2 were bottom anchored in 1690 and 1960 meters of water respectively on 24 July 1974. Array 2 was retrieved on 9 September 1974 while Array 1 was retrieved a day later on 10 September 1974. The exercise yielded six usable data records for Array 1 and five for Array 2. The USNS WILKES (TAGS-33) was used for the implantation and recovery operations.

For information on (1) current meter components and hardware, (2) implant and recovery procedures, (3) physical characteristics of current meters and transponder/release devices, and (4) schematic representations of arrays, refer to NAVOCEANO TECHNICAL NOTE NO. 6110-2-75, "Results of Current Observations - WILKES Norwegian Sea Operations - (Arrays 3 and 4)".

Figure 1 shows the geographic locations of Arrays 1 and 2.

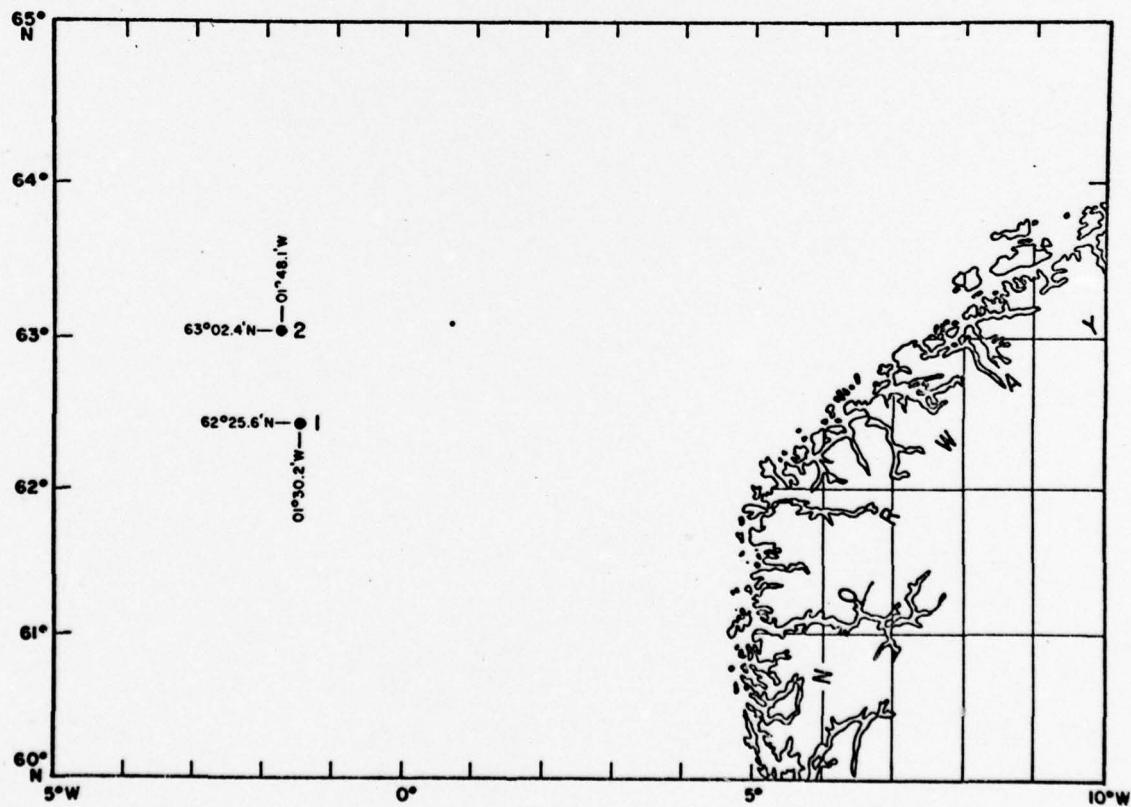


Figure 1. Geographic Location of Arrays

DATA PROCESSING

After recovery, the current meter cameras were unloaded and data films were developed at the Naval Research Laboratory (NRL). The developed films were processed at NAVOCEANO by an in-house developed Optical Digital Analog Computer (OPDAC). OPDAC transfers digital data from the film onto IBM magnetic tape and also generates a multichannel strip chart analog trace of the data. A summary of current meter data is shown in Tables 1 and 2. The number of frames listed for each current meter (last column in each of these tables) is based on the number of data frames actually read by OPDAC.

Based on a record length of 1165 hours and 57 minutes (meter start to meter stop time) and a sampling interval of 15 minutes, the maximum number of frames possible for any meter in Array 1 is 4663. The actual number of frames will vary by a small number (higher or lower than the maximum number) if the clock used in starting the sampling is off (plus or minus a few seconds). This can be observed from Table 1 as the actual number of frames for meters N-474, N-472, N-411, N-466, and N-417 is 4638, 4638, 4639, 4638, and 4643 respectively. The film advance mechanism of meter N-429 stopped functioning after the instrument had recorded only 1598 frames of data. The resulting record was thus short by some 3065 frames (791 hours) of data.

The maximum number of data frames possible for any meter on Array 2 is 4540 (a record length of 1135 hours and 13 minutes and a 15 minute sampling rate). Meter N-492 contained 4271 frames of data, due again to a faulty film-advance mechanism. Approximately 270 frames of data (67 hours) were not recorded. No data was recorded on the film from meter N-415. Apparently, the sequence timer failed to operate; consequently, the micro-switch was not actuated and no commands were sent to the electronics to flash light pulses to the data light platen. Further substantiation of this failure was obtained when the batteries for each meter were checked for power drainage; after recovery of the arrays the battery for meter N-415 showed no appreciable drainage.

RESULTS

Figures 2 through 12 are computer printouts of the bivariate distribution of speed (5 cm/sec intervals) and direction (15° intervals) for each meter. Each printout is based on fifteen-minute averages (one data frame).

Data for printouts of Array 1 are for a 48-day period from 0000Z on 24 July through 0000Z on 10 September 1974, with the exception of the printout for meter N-429 (short record). Speeds were high to moderate and decreased with depth down to the 1000 meter level (maximum values of 75 cm/sec occurring at 100 meters decreasing to maximum values of 30 cm/sec at 1000 meters). Between 1000 and 1500 meters speeds increased to a maximum of 45 cm/sec. From 1500 to 1678 meters speeds again decrease with maximum values to 35 cm/sec. Currents throughout the water column (with the exception of the 100 meter level) exhibited a northeast flow pattern. At

WILKES NOR_w SEA 62 25.6N/01 30.2W ARRAY 1 CM N=429 DEPTH = 100M S/R = 15MIN
15-MINUTE AVERAGES WATER DEPTH = 1620M START TIME = 2210 23-JUL-74 R/L = 1165 MRS

NUMBER OF ZERO SPEED AVERAGES =
TOTAL NUMBER OF OSS's = 1593

PERCENTAGE ZERO SPEED AVERAGES = 0.0

Figure 2. Bivariate Distribution - Army 1, C/M N-429

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WILKES NORW SEA 62 25.6'N/01 30.2W ARRAY 1 CM N=474 DEPTH = 200M S/R = 15MIN
15-MINUTE AVERAGES WATER DEPTH = 1690M START TIME = 2210 23 JUL 74 R/L = 1165 HRS

NUMBER OF ZERO SPEED AVERAGES = 0
TOTAL NUMBER OF OBS. = 4587
PERCENTAGE ZERO SPEED AVERAGES = 0.0

Figure 3. Bivariate Distribution - Array 1, C/M N-474

4

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WILKES NORW SEA 62 25.6N/01 30.2W ARRAY 1 CM N=472 DEATH = 500M S/R = 15MIN
15-MINUTE AVERAGES WATER DEPTH = 1690M START TIME = 2210 23JUL74 R/L = 1165 HRS

NUMBER OF ZERO SPEED AVERAGES = 0
TOTAL NUMBER OF OBS. = 4587
PERCENTAGE ZERO SPEED AVERAGES = 0.0

Figure 4. Bivariate Distribution - Array 1, C/M N-472

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WILKES NORW SEA 62 25.6N/01 30.2W ARRAY 1 CM N=466 DEPTH =1500M S/R = 15MIN
15=4MINUTE AVERAGES WATER DEPTH =1690M START TIME = 2210 23JUL74 R/L =1165 HRS

DIRECTION	SUM	PER.CT.
0= 15	26	4.2
15= 30	31	7.4
30= 45	36	12.8
45= 60	40	5.8
60= 75	38	9.9
75= 90	36	9.8
90=105	26	4.8
105=120	11	3.0
120=135	8	2.3
135=150	10	2.5
150=165	8	2.0
165=180	11	2.5
180=195	16	4.0
195=210	10	2.2
210=225	13	3.0
225=240	11	2.4
240=255	13	3.1
255=270	6	1.4
270=285	27	3.2
285=300	34	4.6
300=315	32	4.1
315=330	26	5.6
330=345	31	4.1
345=360	32	3.7
SPEED	0	0.0
SUM	511	1961
PER.CT.	11.1	42.8

NUMBER OF ZERO SPEED AVERAGES = 0
TOTAL NUMBER OF OBS. = 4587

PERCENTAGE ZERO SPEED AVERAGES = 0.0

PERCENTAGE ZERO SPEED AVERAGES = 0.0

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Figure 6. Bivariate Distribution - Array 1, C/M N-466

WILKES NORTH SEA 62 25.6N/01 30.2W APRAY 1 CM N=421 DEPTH =1000
15-MINUTE AVERAGES WATER DEPTH =1630M START TIME = 2210 23 JULY 74 R/L =1165 HRS

DIRECTION	SUM	PER.CT.
0° 15	89	42
15° 30	110	70
30° 45	98	125
45° 60	157	236
60° 75	135	263
75° 90	63	95
90° 105	2	35
105° 120	44	15
120° 135	1	34
135° 150	2	27
150° 165	16	40
165° 180	16	21
180° 195	1	23
195° 210	19	24
210° 225	1	38
225° 240	2	67
240° 255	4	113
255° 270	9	79
270° 285	5	101
285° 300	1	55
300° 315	4	76
315° 330	13	80
330° 345	10	113
345° 360	15	126
SPEED	0 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100	
SUM	105 1730 1752 780 200 18 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	4585
PER.CT.	2.3 37.7 38.2 17.0 4.4 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
NUMBER OF SPEED AVERAGES = 3		
TOTAL NUMBER OF OBS. = 4588		
PERCENTAGE ZERO SPEED AVERAGES = 0.1		

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Figure 5. Bivariate Distribution - Array 1, C/M N-411

WILKES NORW SEA 62 25.6N/01 30.2W ARRAY 1 CM N=417 DEPTH =1678M S/R = 15MIN
15-MINUTE AVERAGES WATER DEPTH =1690M START TIME = 2210 23 JUL 74 R/L =1165 HRS

DIRECTION	SPEED	PER.CT.	SUM
0- 15	4.5	4.5	207
15- 30	5.5	5.5	254
30- 45	8.8	8.8	402
45- 60	10.2	10.2	412
60- 75	8.3	5.0	380
75- 90	7.0	5.3	376
90-105	5.4	5.4	223
105-120	7.1	4.0	162
120-135	5.3	1.3	107
135-150	3.6	4.0	83
150-165	4.0	1.1	92
165-180	2.9	1.2	4.4
180-195	1.6	1.6	4.4
195-210	1.4	1.1	4.5
210-225	1.2	1.2	7.6
225-240	1.2	3	17.0
240-255	1.2	1.2	3.7
255-270	1.2	1.2	200
270-285	1.2	1.2	212
285-300	1.2	1.1	21.0
300-315	1.2	1.2	11.0
315-330	1.2	1.4	12.3
330-345	1.2	1.5	17.4
345-360	1.2	1.2	3.8
360-375	1.2	1.2	5.0
375-390	1.2	1.2	22.8
390-405	1.2	1.2	21.7
405-420	1.2	1.2	25.1
420-435	1.2	1.2	5.5
435-450	1.2	1.2	4.5
450-465	1.2	1.2	4.4
465-480	1.2	1.2	4.4
480-495	1.2	1.2	4.4
495-510	1.2	1.2	4.4
510-525	1.2	1.2	4.4
525-540	1.2	1.2	4.4
540-555	1.2	1.2	4.4
555-570	1.2	1.2	4.4
570-585	1.2	1.2	4.4
585-600	1.2	1.2	4.4
600-615	1.2	1.2	4.4
615-630	1.2	1.2	4.4
630-645	1.2	1.2	4.4
645-660	1.2	1.2	4.4
660-675	1.2	1.2	4.4
675-690	1.2	1.2	4.4
690-705	1.2	1.2	4.4
705-720	1.2	1.2	4.4
720-735	1.2	1.2	4.4
735-750	1.2	1.2	4.4
750-765	1.2	1.2	4.4
765-780	1.2	1.2	4.4
780-795	1.2	1.2	4.4
795-810	1.2	1.2	4.4
810-825	1.2	1.2	4.4
825-840	1.2	1.2	4.4
840-855	1.2	1.2	4.4
855-870	1.2	1.2	4.4
870-885	1.2	1.2	4.4
885-900	1.2	1.2	4.4
900-915	1.2	1.2	4.4
915-930	1.2	1.2	4.4
930-945	1.2	1.2	4.4
945-960	1.2	1.2	4.4
960-975	1.2	1.2	4.4
975-990	1.2	1.2	4.4
990-1005	1.2	1.2	4.4
1005-1020	1.2	1.2	4.4
1020-1035	1.2	1.2	4.4
1035-1050	1.2	1.2	4.4
1050-1065	1.2	1.2	4.4
1065-1080	1.2	1.2	4.4
1080-1095	1.2	1.2	4.4
1095-1110	1.2	1.2	4.4
1110-1125	1.2	1.2	4.4
1125-1140	1.2	1.2	4.4
1140-1155	1.2	1.2	4.4
1155-1170	1.2	1.2	4.4
1170-1185	1.2	1.2	4.4
1185-1200	1.2	1.2	4.4
1200-1215	1.2	1.2	4.4
1215-1230	1.2	1.2	4.4
1230-1245	1.2	1.2	4.4
1245-1260	1.2	1.2	4.4
1260-1275	1.2	1.2	4.4
1275-1290	1.2	1.2	4.4
1290-1305	1.2	1.2	4.4
1305-1320	1.2	1.2	4.4
1320-1335	1.2	1.2	4.4
1335-1350	1.2	1.2	4.4
1350-1365	1.2	1.2	4.4
1365-1380	1.2	1.2	4.4
1380-1395	1.2	1.2	4.4
1395-1410	1.2	1.2	4.4
1410-1425	1.2	1.2	4.4
1425-1440	1.2	1.2	4.4
1440-1455	1.2	1.2	4.4
1455-1470	1.2	1.2	4.4
1470-1485	1.2	1.2	4.4
1485-1500	1.2	1.2	4.4
1500-1515	1.2	1.2	4.4
1515-1530	1.2	1.2	4.4
1530-1545	1.2	1.2	4.4
1545-1560	1.2	1.2	4.4
1560-1575	1.2	1.2	4.4
1575-1590	1.2	1.2	4.4
1590-1605	1.2	1.2	4.4
1605-1620	1.2	1.2	4.4
1620-1635	1.2	1.2	4.4
1635-1650	1.2	1.2	4.4
1650-1665	1.2	1.2	4.4
1665-1680	1.2	1.2	4.4
1680-1695	1.2	1.2	4.4
1695-1710	1.2	1.2	4.4
1710-1725	1.2	1.2	4.4
1725-1740	1.2	1.2	4.4
1740-1755	1.2	1.2	4.4
1755-1770	1.2	1.2	4.4
1770-1785	1.2	1.2	4.4
1785-1800	1.2	1.2	4.4
1800-1815	1.2	1.2	4.4
1815-1830	1.2	1.2	4.4
1830-1845	1.2	1.2	4.4
1845-1860	1.2	1.2	4.4
1860-1875	1.2	1.2	4.4
1875-1890	1.2	1.2	4.4
1890-1905	1.2	1.2	4.4
1905-1920	1.2	1.2	4.4
1920-1935	1.2	1.2	4.4
1935-1950	1.2	1.2	4.4
1950-1965	1.2	1.2	4.4
1965-1980	1.2	1.2	4.4
1980-1995	1.2	1.2	4.4
1995-2010	1.2	1.2	4.4
2010-2025	1.2	1.2	4.4
2025-2040	1.2	1.2	4.4
2040-2055	1.2	1.2	4.4
2055-2070	1.2	1.2	4.4
2070-2085	1.2	1.2	4.4
2085-2100	1.2	1.2	4.4
2100-2115	1.2	1.2	4.4
2115-2130	1.2	1.2	4.4
2130-2145	1.2	1.2	4.4
2145-2160	1.2	1.2	4.4
2160-2175	1.2	1.2	4.4
2175-2190	1.2	1.2	4.4
2190-2205	1.2	1.2	4.4
2205-2220	1.2	1.2	4.4
2220-2235	1.2	1.2	4.4
2235-2250	1.2	1.2	4.4
2250-2265	1.2	1.2	4.4
2265-2280	1.2	1.2	4.4
2280-2295	1.2	1.2	4.4
2295-2310	1.2	1.2	4.4
2310-2325	1.2	1.2	4.4
2325-2340	1.2	1.2	4.4
2340-2355	1.2	1.2	4.4
2355-2370	1.2	1.2	4.4
2370-2385	1.2	1.2	4.4
2385-2400	1.2	1.2	4.4
2400-2415	1.2	1.2	4.4
2415-2430	1.2	1.2	4.4
2430-2445	1.2	1.2	4.4
2445-2460	1.2	1.2	4.4
2460-2475	1.2	1.2	4.4
2475-2490	1.2	1.2	4.4
2490-2505	1.2	1.2	4.4
2505-2520	1.2	1.2	4.4
2520-2535	1.2	1.2	4.4
2535-2550	1.2	1.2	4.4
2550-2565	1.2	1.2	4.4
2565-2580	1.2	1.2	4.4
2580-2595	1.2	1.2	4.4
2595-2610	1.2	1.2	4.4
2610-2625	1.2	1.2	4.4
2625-2640	1.2	1.2	4.4
2640-2655	1.2	1.2	4.4
2655-2670	1.2	1.2	4.4
2670-2685	1.2	1.2	4.4
2685-2700	1.2	1.2	4.4
2700-2715	1.2	1.2	4.4
2715-2730	1.2	1.2	4.4
2730-2745	1.2	1.2	4.4
2745-2760	1.2	1.2	4.4
2760-2775	1.2	1.2	4.4
2775-2790	1.2	1.2	4.4
2790-2805	1.2	1.2	4.4
2805-2820	1.2	1.2	4.4
2820-2835	1.2	1.2	4.4
2835-2850	1.2	1.2	4.4
2850-2865	1.2	1.2	4.4
2865-2880	1.2	1.2	4.4
2880-2895	1.2	1.2	4.4
2895-2910	1.2	1.2	4.4
2910-2925	1.2	1.2	4.4
2925-2940	1.2	1.2	4.4
2940-2955	1.2	1.2	4.4
2955-2970	1.2	1.2	4.4
2970-2985	1.2	1.2	4.4
2985-2995	1.2	1.2	4.4
2995-3010	1.2	1.2	4.4
3010-3025	1.2	1.2	4.4
3025-3040	1.2	1.2	4.4
3040-3055	1.2	1.2	4.4
3055-3070	1.2	1.2	4.4
3070-3085	1.2	1.2	4.4
3085-3095	1.2	1.2	4.4
3095-3105	1.2	1.2	4.4
3105-3115	1.2	1.2	4.4
3115-3125	1.2	1.2	4.4
3125-3135	1.2	1.2	4.4
3135-3145	1.2	1.2	4.4
3145-3155	1.2	1.2	4.4
3155-3165	1.2	1.2	4.4
3165-3175	1.2	1.2	4.4
3175-3185	1.2	1.2	4.4
3185-3195	1.2	1.2	4.4
3195-3205	1.2	1.2	4.4
3205-3215	1.2	1.2	4.4
3215-3225	1.2	1.2	4.4
3225-3235	1.2	1.2	4.4
3235-3245	1.2	1.2	4.4
3245-3255	1.2	1.2	4.4
3255-3265	1.2	1.2	4.4
3265-3275	1.2	1.2	4.4
3275-3285	1.2	1.2	4.4
3285-3295	1.2	1.2	4.4
3295-3305	1.2	1.2	4.4
3305-3315	1.2	1.2	4.4
3315-3325	1.2	1.2	4.4
3325-3335	1.2	1.2	4.4
3335-3345	1.2	1.2	4.4
3345-3355	1.2	1.2	4.4
3355-3365	1.2	1.2	4.4
3365-3375	1.2	1.2	4.4
3375-3385	1.2	1.2	4.4
3385-3395	1.2	1.2	4.4
3395-3405	1.2	1.2	4.4
3405-3415	1.2	1.2	4.4
3415-3425	1.2	1.2	4.4
3425-3435	1.2	1.2	4.4
3435-3445	1.2	1.2	4.4
3445-3455	1.2	1.2	4.4
3455-3465	1.2	1.2	4.4
3465-3475	1.2	1.2	4.4
3475-3485	1.2	1.2	4.4
3485-3495	1.2	1.2	4.4
3495-3505	1.2	1.2	4.4
3505-3515	1.2	1.2	4.4
3515-3525	1.2	1.2	4.4
3525-3535	1.2	1.2	4.4
3535-3545	1.2	1.2	4.4
3545-3555	1.2	1.2	4.4
3555-3565	1.2	1.2	4.4
3565-3575	1.2	1.2	4.4
3575-3585	1.2	1.2	4.4
3585-3595	1.2	1.2	4.4
3595-3605	1.2	1.2	4.4
3605-3615	1.2	1.2	4.4
3615-3625	1.2	1.2	4.4
3625-3635	1.2	1.2	4.4
3635-3645	1.2	1.2	4.4
3645-3655	1.2	1.2	4.4
3655-3665	1.2	1.2	4.4
3665-3675	1.2	1.2	4.4
3675-3685	1.2	1.2	4.4
3685-3695	1.2	1.2	4.4
3695-3705	1.2	1.2	4.4
3705-3715	1.2	1.2	4.4
3715-3725	1.2	1.2	4.4
3725-3735	1.2	1.2	4.4
3735-3745	1.2	1.2	4.4
3745-3755	1.2	1.2	4.4
3755-3765	1.2	1.2	4.4
3765-3775	1.2	1.2	4.4
3775-3785	1.2	1.2	4.4
3785-3795	1.2	1.2	4.4
3795-3805	1.2	1.2	4.4
3805-3815	1.2	1.2	4.4
3815-3825	1.2	1.2	4.4
3825-3835	1.2	1.2	4.4
3835-3845	1.2	1.2	4.4
3845-3855	1.2	1.2	4.4
3855-3865	1.2	1.2	4.4
3865-3875	1.2	1.2	4.4
3875-3885	1.2	1.2	4.4
3885-3895	1.2	1.2	4.4
3895-3905	1.2	1.2	4.4
3905-3915	1.2	1.2	4.4
3915-3925	1.2	1.2	4.4
3925-3935	1.2	1.2	4.4
3935-3945			

NUMBER OF ZERO SPEED AVERAGES
TOTAL NUMBER OF OBS. # 4592

PERCENTAGE ZERO SPEED AVERAGES = 0.0

Figure 7. Bivariate Distribution - Array 1, C/M N-417

BEST AVAILABLE COPY

WILKES NORW SEA 63 02-AN/02 48.1W ARRAY 2 CM N=467 DEPTH = 100M S/R = 15MIN
15-MINUTE AVERAGES WATER DEPTH 81960M START TIME = 0847 24 JUL 74 R/L #1135 WRS

DIRECTION	SPEED	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
SUM	0.1	3	1	35	220	361	452	434	647	707	497	704	242	100	32	2	0	0	0	0	0	4442	
PER.CT.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
0= 15	5	15= 30	2	30= 45	3	45= 60	5	60= 75	1	75= 90	1	90=105	1	105=120	1	120=135	1	135=150	1	150=165	1	165=180	1
15= 30	19	30= 45	13	45= 60	5	60= 75	12	75= 90	10	90=105	10	105=120	11	120=135	11	135=150	10	150=165	11	165=180	12	180=195	13
30= 45	21	45= 60	14	60= 75	9	75= 90	10	90=105	10	105=120	11	120=135	11	135=150	11	150=165	11	165=180	12	180=195	13	195=210	14
45= 60	26	60= 75	26	75= 90	23	90=105	13	105=120	13	120=135	13	135=150	13	150=165	13	165=180	13	180=195	13	195=210	13	210=225	14
60= 75	31	75= 90	28	90=105	23	105=120	13	120=135	13	135=150	13	150=165	13	165=180	13	180=195	13	195=210	13	210=225	13	225=240	14
75= 90	32	90=105	29	105=120	23	120=135	13	135=150	13	150=165	13	165=180	13	180=195	13	195=210	13	210=225	13	225=240	13	240=255	14
90=105	39	105=120	30	120=135	23	135=150	13	150=165	13	165=180	13	180=195	13	195=210	13	210=225	13	225=240	13	240=255	13	255=270	14
105=120	27	120=135	30	135=150	23	150=165	13	165=180	13	180=195	13	195=210	13	210=225	13	225=240	13	240=255	13	255=270	13	270=285	14
120=135	31	135=150	30	150=165	23	165=180	13	180=195	13	195=210	13	210=225	13	225=240	13	240=255	13	255=270	13	270=285	13	285=300	14
135=150	32	150=165	30	165=180	23	180=195	13	195=210	13	210=225	13	225=240	13	240=255	13	255=270	13	270=285	13	285=300	13	300=315	14
150=165	39	165=180	30	180=195	23	195=210	13	210=225	13	225=240	13	240=255	13	255=270	13	270=285	13	285=300	13	300=315	13	315=330	14
165=180	21	180=195	30	195=210	23	210=225	13	225=240	13	240=255	13	255=270	13	270=285	13	285=300	13	300=315	13	315=330	13	330=345	14
180=195	26	195=210	30	210=225	23	225=240	13	240=255	13	255=270	13	270=285	13	285=300	13	300=315	13	315=330	13	330=345	13	345=360	14
195=210	31	210=225	30	225=240	23	240=255	13	255=270	13	270=285	13	285=300	13	300=315	13	315=330	13	330=345	13	345=360	13	360=375	14
210=225	32	225=240	30	240=255	23	255=270	13	270=285	13	285=300	13	300=315	13	315=330	13	330=345	13	345=360	13	360=375	13	375=390	14
225=240	39	240=255	30	255=270	23	270=285	13	285=300	13	300=315	13	315=330	13	330=345	13	345=360	13	360=375	13	375=390	13	390=405	14
240=255	27	255=270	30	270=285	23	285=300	13	300=315	13	315=330	13	330=345	13	345=360	13	360=375	13	375=390	13	390=405	13	405=420	14
255=270	31	270=285	30	285=300	23	300=315	13	315=330	13	330=345	13	345=360	13	360=375	13	375=390	13	390=405	13	405=420	13	420=435	14
270=285	32	285=300	30	300=315	23	315=330	13	330=345	13	345=360	13	360=375	13	375=390	13	390=405	13	405=420	13	420=435	13	435=450	14
285=300	39	300=315	30	315=330	23	330=345	13	345=360	13	360=375	13	375=390	13	390=405	13	405=420	13	420=435	13	435=450	13	450=465	14
300=315	21	315=330	30	330=345	23	345=360	13	360=375	13	375=390	13	390=405	13	405=420	13	420=435	13	435=450	13	450=465	13	465=480	14
315=330	26	330=345	30	345=360	23	360=375	13	375=390	13	390=405	13	405=420	13	420=435	13	435=450	13	450=465	13	465=480	13	480=495	14
330=345	31	345=360	30	360=375	23	375=390	13	390=405	13	405=420	13	420=435	13	435=450	13	450=465	13	465=480	13	480=495	13	495=510	14
345=360	32	360=375	30	375=390	23	390=405	13	405=420	13	420=435	13	435=450	13	450=465	13	465=480	13	480=495	13	495=510	13	510=525	14
360=375	39	375=390	30	390=405	23	405=420	13	420=435	13	435=450	13	450=465	13	465=480	13	480=495	13	495=510	13	510=525	13	525=540	14
380=395	27	390=405	30	405=420	23	420=435	13	435=450	13	450=465	13	465=480	13	480=495	13	495=510	13	510=525	13	525=540	13	540=555	14
400=415	31	405=420	30	420=435	23	435=450	13	450=465	13	465=480	13	480=495	13	495=510	13	510=525	13	525=540	13	540=555	13	555=570	14
420=435	32	420=435	30	435=450	23	450=465	13	465=480	13	480=495	13	495=510	13	510=525	13	525=540	13	540=555	13	555=570	13	570=585	14
440=455	39	435=450	30	450=465	23	465=480	13	480=495	13	495=510	13	510=525	13	525=540	13	540=555	13	555=570	13	570=585	13	585=600	14
460=475	21	450=465	30	465=480	23	480=495	13	495=510	13	510=525	13	525=540	13	540=555	13	555=570	13	570=585	13	585=600	13	600=615	14
480=495	26	465=480	30	480=495	23	495=510	13	510=525	13	525=540	13	540=555	13	555=570	13	570=585	13	585=600	13	600=615	13	615=630	14
500=515	31	495=510	30	510=525	23	525=540	13	540=555	13	555=570	13	570=585	13	585=600	13	600=615	13	615=630	13	630=645	13	645=660	14
520=535	32	510=525	30	525=540	23	540=555	13	555=570	13	570=585	13	585=600	13	600=615	13	615=630	13	630=645	13	645=660	13	660=675	14
540=555	39	525=540	30	540=555	23	555=570	13	570=585	13	585=600	13	600=615	13	615=630	13	630=645	13	645=660	13	660=675	13	675=690	14
560=575	21	540=555	30	555=570	23	570=585	13	585=600	13	600=615	13	615=630	13	630=645	13	645=660	13	660=675	13	675=690	13	690=705	14
580=595	26	555=570	30	570=585	23	585=600	13	600=615	13	615=630	13	630=645	13	645=660	13	660=675	13	675=690	13	690=705	13	705=720	14
600=615	31	570=585	30	585=600	23	600=615	13	615=630	13	630=645	13	645=660	13	660=675	13	675=690	13	690=705	13	705=720	13	720=735	14
620=635	32	585=600	30	600=615	23	615=630	13	630=645	13	645=660	13	660=675	13	675=690	13	690=705	13	705=720	13	720=735	13	735=750	14
640=655	39	600=615	30	615=630	23	630=645	13	645=660	13	660=675	13	675=690	13	690=705	13	705=720	13	720=735	13	735=750	13	750=765	14
660=675	21	615=630	30	630=645	23	645=660	13	660=675	13	675=690	13	690=705	13	705=720	13	720=735	13	735=750	13	750=765	13	765=780	14
680=695	26	630=645	30	645=660	23	660=675	13	675=690	13	690=705	13	705=720	13	720=735	13	735=750	13	750=765	13	765=780	13	780=795	14
700=715	31	645=660	30	660=675	23	675=690	13	690=705	13	705=720	13	720=735	13	735=750	13	750=765	13	765=780	13	780=795	13	795=810	14
720=735	32	660=675	30	675=690	23	690=705	13	705=720	13	720=735	13	735=750	13	750=765	13	765=780	13	780=795	13	795=810	13	810=825	14
740=755	39	675=690	30	690=705	23	705=720	13	720=735	13	735=750	13	750=765	13	765=780	13	780=795	13	795=810	13	810=825	13	825=840	14
760=775	21	690=705	30	705=720	23	720=735	13	735=750	13	750=765	13	765=780	13	780=795	13	795=810	13	810=825	13	825=840	13	840=855	14
780=795	26	705=720	30	720=735	23	735=750	13	750=765	13	765=780	13	780=795	13	795=810	13	810=825	13	825=840	13	840=855	13	855=870	14
800=815	31	720=735	30	735=750	23	750=765	13	765=780	13	780=795	13	795=810	13	810=825	13	825=840	13	840=855	13	855=870	13	870=885	14
820=835	32	735=750	30	750=765	23	765=780	13	780=795	13	795=810	13	810=825	13	825=840	13	840=855	13	855=870	13	870=885	13	885=900	14
840=855	39	750=765	30	765=780	23	780=795	13	795=810	13	810=825	13	825=840	13	840=855	13	855=870	13	870=885	13	885=900	13	900=915	14
860=875	21	765=780	30	780=795	23	795=810	13	810=825	13	825=840	13	840=855	13	855=870									

NUMBER OF ZERO SPEED AVERAGES = 0
TOTAL NUMBER OF OBS. = 4442
PERCENTAGE ZERO SPEED AVERAGES = 0.0

Figure 8. Bivariate Distribution - Array 2, C/M N-467

WILKES NORW SEA 63 02-4N/02 48.WN ARRAY 2 CM N=400 DEATH = 200M S/R = 15MIN
15-MINUTE AVERAGES WATER DEPTH = 1960M START TIME = 0847 24JUL74 R/L = 1135 HRS

NUMBER OF ZERO SPEED AVERAGES = 1
TOTAL NUMBER OF OBS. = 64443
PERCENTAGE ZERO SPEED AVERAGES = 0.0

Figure 9. Bivariate Distribution - Array 2, C/M N-400

10

BEST AVAILABLE COPY

WILKES NORN SEA 63 02-4N/02 48.1W ARRAY 2 CM N=492 DEPTH = 500M S/R = 15MIN 15-MINUTE AVERAGES WATER DEPTH = 1960M START TIME = 0844 24 JUL 74 R/L = 135 MRS

NUMBER OF ZERO SPEED AVERAGES = 37
TOTAL NUMBER OF OBS. = 4102
PERCENTAGE ZERO SPEED AVERAGES = 0.9

Figure 10. Bivariate Distribution - Array 2, C/M N-492

BEST AVAILABLE COPY

WILKES NORW SEA 63 02°4N/02 48°1W ARRAY 2 CM N°687 DEPTH = 1000M S/R = 15MIN
15-MINUTE AVERAGES WATER DEPTH = 1960M START TIME = 0847 24 JULY 74 R/L = 1135 HRS

DIRECTION	SUM	PER.CT.
0° - 15°	9	4.8
15° - 30°	16	10.9
30° - 45°	24	13.7
45° - 60°	37	19.0
60° - 75°	35	16.0
75° - 90°	22	14.5
90° - 105°	34	23.8
105° - 120°	19	12.4
120° - 135°	22	9.5
135° - 150°	4	2.5
150° - 165°	12	8.5
165° - 180°	12	8.6
180° - 195°	11	11.2
195° - 210°	23	16.4
210° - 225°	30	19.4
225° - 240°	26	17.3
240° - 255°	5	3.7
255° - 270°	11	13.4
270° - 285°	21	10.9
285° - 300°	10	8.2
300° - 315°	15	10.4
315° - 330°	7	4.9
330° - 345°	13	7.4
345° - 360°	12	10.0
		12.0
SPEED	0	5 10 15 20 25 30 40 45 50 55 60 65 70 75 80 85 90 95 100
SUM	42.0	3217 786 6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
PER.CT.	9.5	72.5 17.7 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0

NUMBER OF ZERO SPEED AVERAGES = 9
TOTAL NUMBER OF OBS. = 4437

PERCENTAGE ZERO SPEED AVERAGES = 0.2

4428

Figure 11. Bivariate Distribution - Array 2, C/M N-487

12 BEST AVAILABLE COPY

WILKES NORR SEA 63 02°4N/02 48.1W ARRAY 2 CM N=491 DEPTH =1948M S/R = 15MIN
15-MINUTE AVERAGES WATER DEPTH =1960M START TIME # 0847 24JUL74 R/L =1135 HRS

DIRECTION	SUM	PER.CT.
0°- 15°	28	4.2
15°- 30°	29	4.6
30°- 45°	30	5.1
45°- 60°	142	88
60°- 75°	26	58
75°- 90°	31	59
90°-105°	39	79
105°-120°	40	45
120°-135°	55	37
135°-150°	43	19
150°-165°	51	23
165°-180°	30	19
180°-195°	23	16
195°-210°	29	55
210°-225°	48	10
225°-240°	24	65
240°-255°	77	21
255°-270°	15	96
270°-285°	14	57
285°-300°	16	73
300°-315°	21	27
315°-330°	27	128
330°-345°	26	34
345°-360°	52	125
SPEED	0	11
SUM	759	2868
PER.CT.	17.1	64.6

NUMBER OF ZERO SPEED AVERAGES = 11
TOTAL NUMBER OF OBS. = 4440

PERCENTAGE ZERO SPEED AVERAGES = 0.2

SPEED	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
SUM	759	2868	786	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PER.CT.	17.1	64.6	17.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Figure 12. Bivariate Distribution - Array 2, C/M N491

CURRENT METER S/N	METER DEPTH (meters)	METER START TIME	ARRAY MOORED	RELEASE DEVICE FIRED	METER STOP TIME	SAMPLING INTERVAL (minutes)	RECORD LENGTH	NO. OF FRAMES ON FILM
N-429	100	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	1598
N-474	200	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4638
N-472	500	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4638
N-411	1000	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4639
N-466	1500	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4638
N-417	1678	7-23-74 2210Z	7-24-74 0200Z	9-10-74 0746Z	9-10-74 1207Z	15	1165 hrs 57 min	4643

Table 1. Summary of Current Meter Data - Array 1.

CURRENT METER S/N	METER DEPTH (meters)	METER START TIME	ARRAY MOORED	RELEASE DEVICE FIRED	METER STOP TIME	SAMPLING INTERVAL (minutes)	RECORD LENGTH	NO. OF FRAMES ON FILM
N-467	100	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4531
N-400	200	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4532
N-492	500	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4271
N-487	1000	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4526
N-415	1500	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	0	none
N-491	1948	7-24-74 0847Z	7-24-74 1200Z	9-9-74 1319Z	9-9-74 1600Z	15	1135 hrs 13 min	4529

Table 2. Summary of Current Meter Data - Array 2.

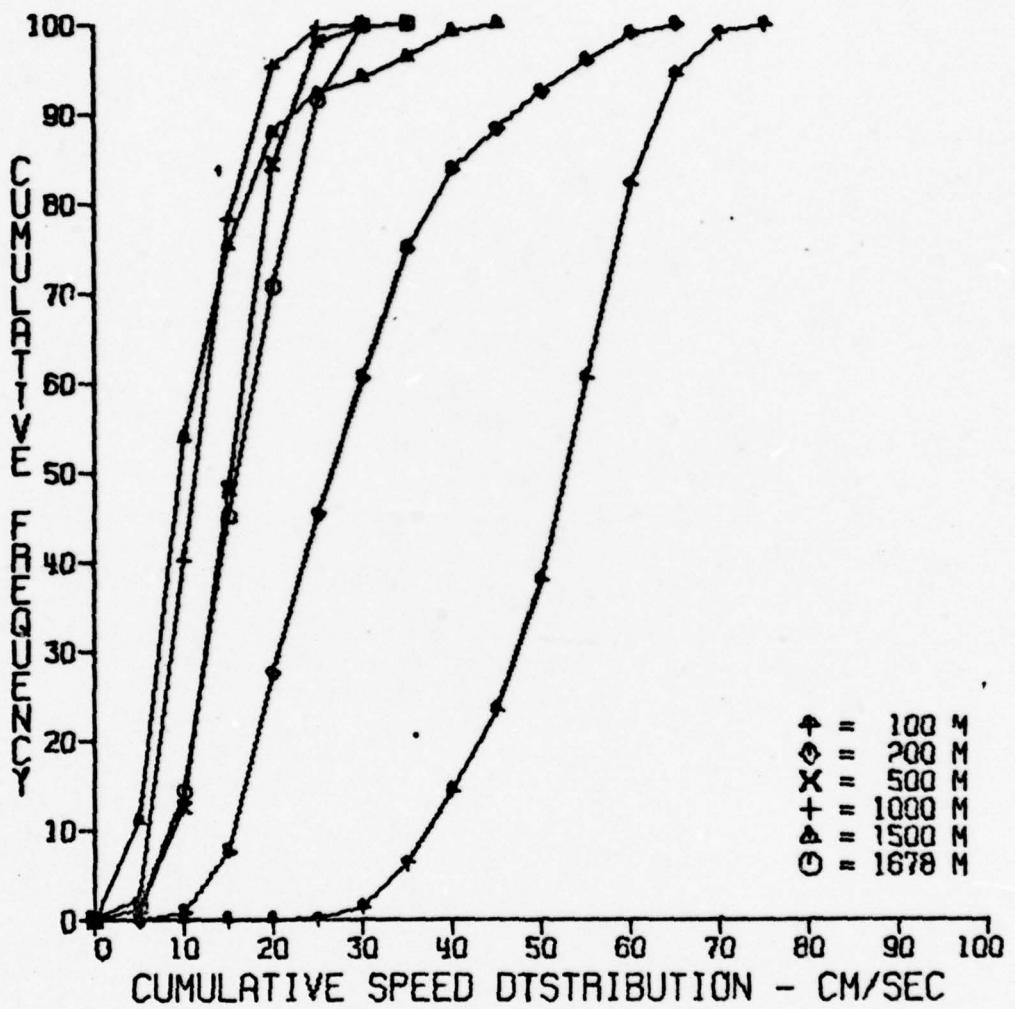
the 100 meter level, no distinct pattern could be determined. This is probably attributed to the fact that the record for the meter at this level was only one-third as long as the records for the other five-meters; therefore, the period of time (16 days) covered by the record may have been too short to establish a set pattern. The maximum speed of 75 cm/sec recorded at 100 meters may not be representative of the total period of the array due to the incomplete record.

Data for printouts of Array 2 span a 46-day period from 0000Z on 25 July through 0000Z on 9 September 1974 (meter N-492 was short by approximately 2 1/2 days). Speeds again were high to moderate and decreased with depth. The maximum values ranged from 90 cm/sec at 100 meters to 20 cm/sec at 1948 meters. It should be noted that the increase in speeds between 1000 and 1500 meters observed in Array 1 could not be detected because the meter (N-415) at 1500 meters did not operate. There appeared to be no dominant direction of flow at any of the five depths monitored by Array 2. Each depth seemed to exhibit two or more directions of flow with no one direction taking precedence over the others.

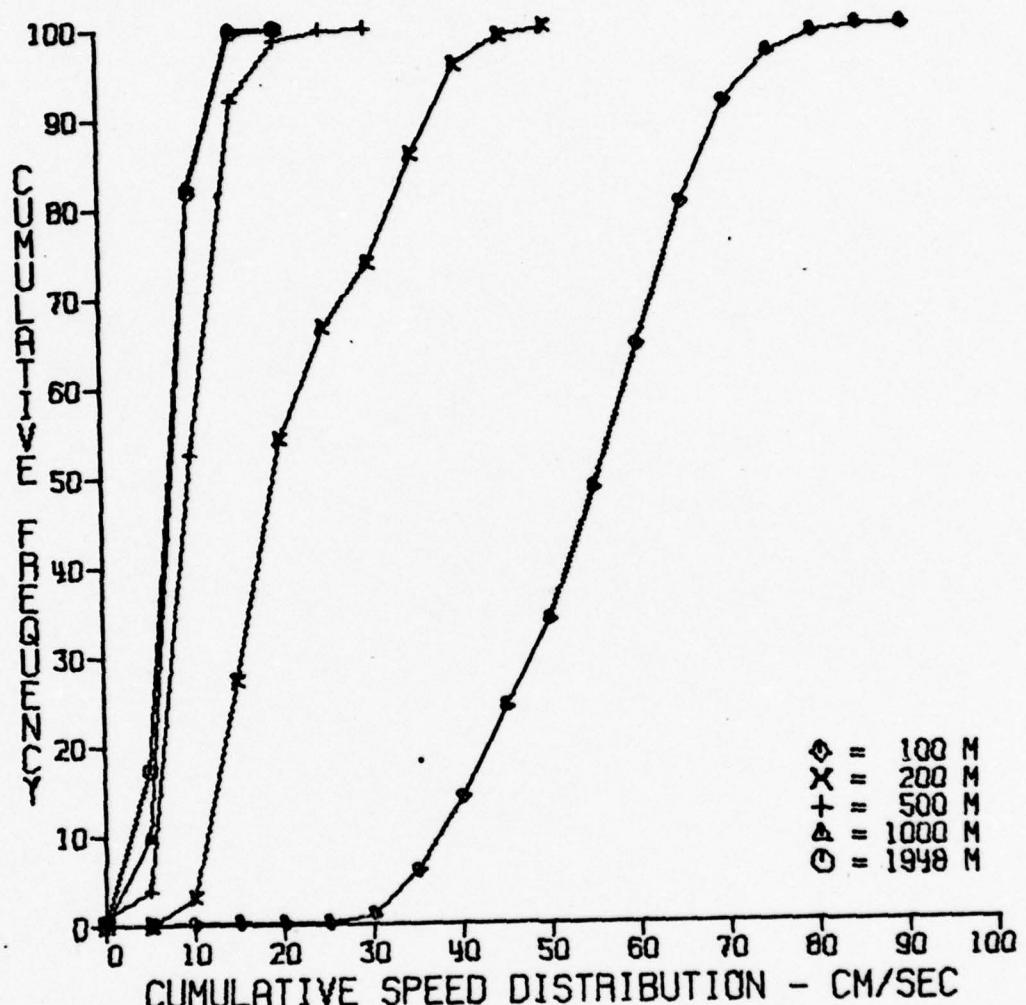
Appendix A contains a cumulative speed distribution graph for each array. Appendix B contains graphs of current vectors as a function of time for each meter of each array. Each plotted line represents a vector averaged over a 60 minute period. The distance between the long tick marks covers a period of 24 hours with each of these time periods being divided by a shorter tick mark representing 12 hours. It should be noted that north is to the reader's right. Currents in the area measured by Array 1 tended to exhibit the same general direction of flow throughout the column. The exception to this trend occurs in the first fifteen days when the top three levels show a different direction of flow than the bottom three levels. Currents in the area of Array 2 showed tidal influence at one or more depths for about 25 of the 46-day period.

BEST AVAILABLE COPY

APPENDIX A
CUMULATIVE SPEED DISTRIBUTION GRAPHS



WILKES NORW SEA ARRAY*1*



WILKES NORW SEA ARRAY #2*

APPENDIX B
GRAPHS OF VECTOR AVERAGES

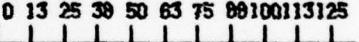
WILKES NORW SEA JULY-SEPT 1974

WATER DEPTH = 1690 METERS

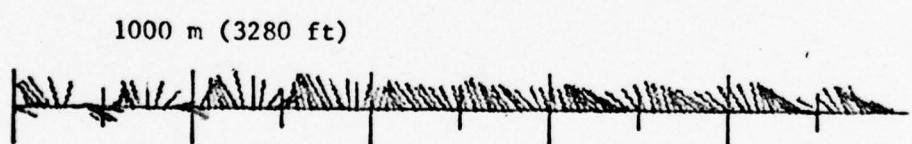
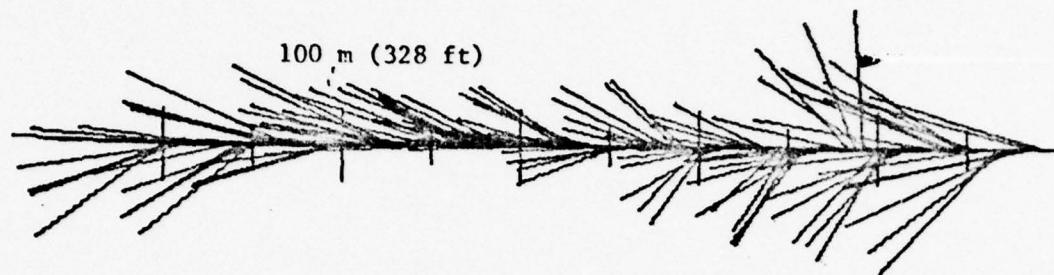
ARRAY *1* HOUR AVERAGES

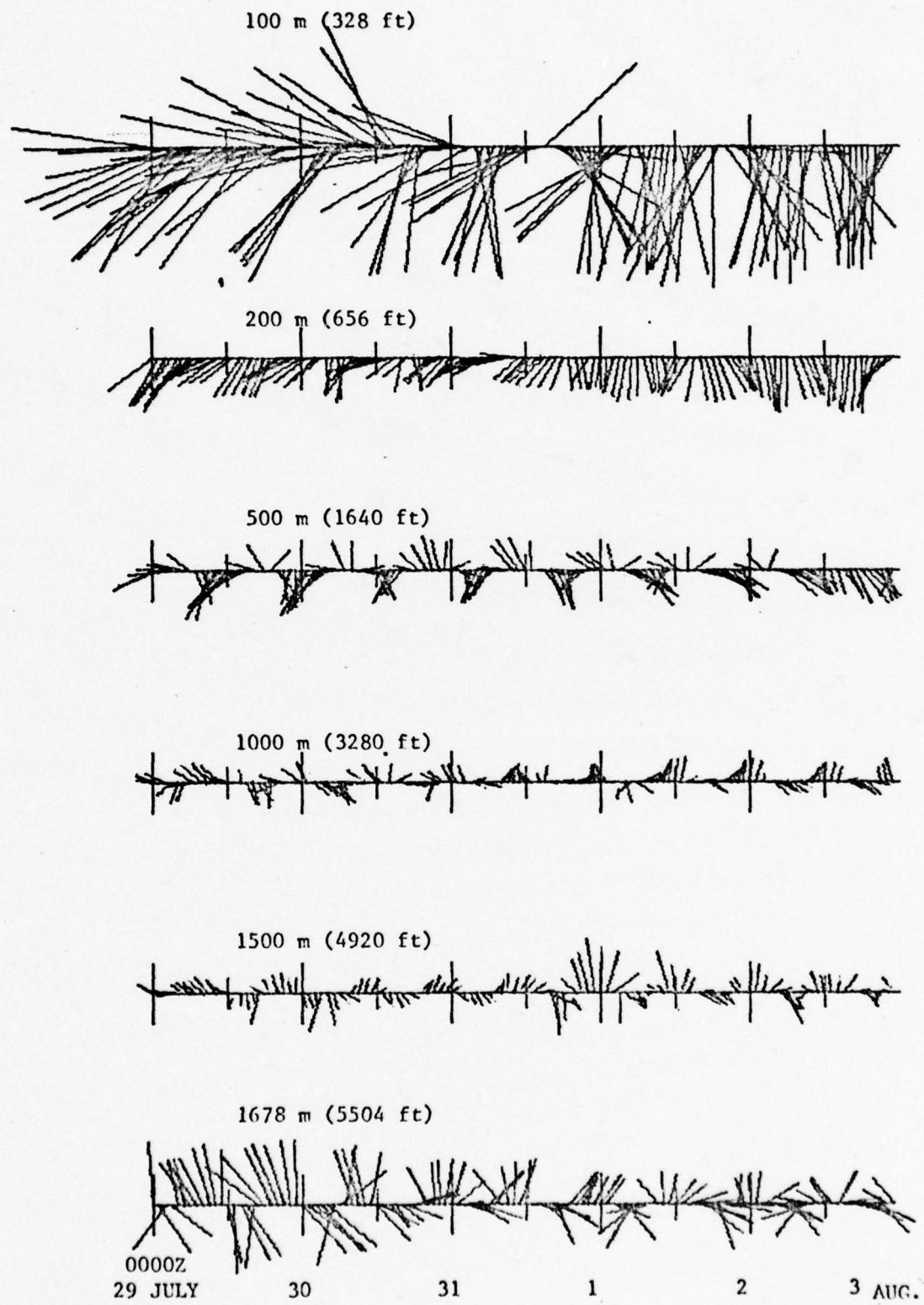
CURRENT METER DEPTH - METERS

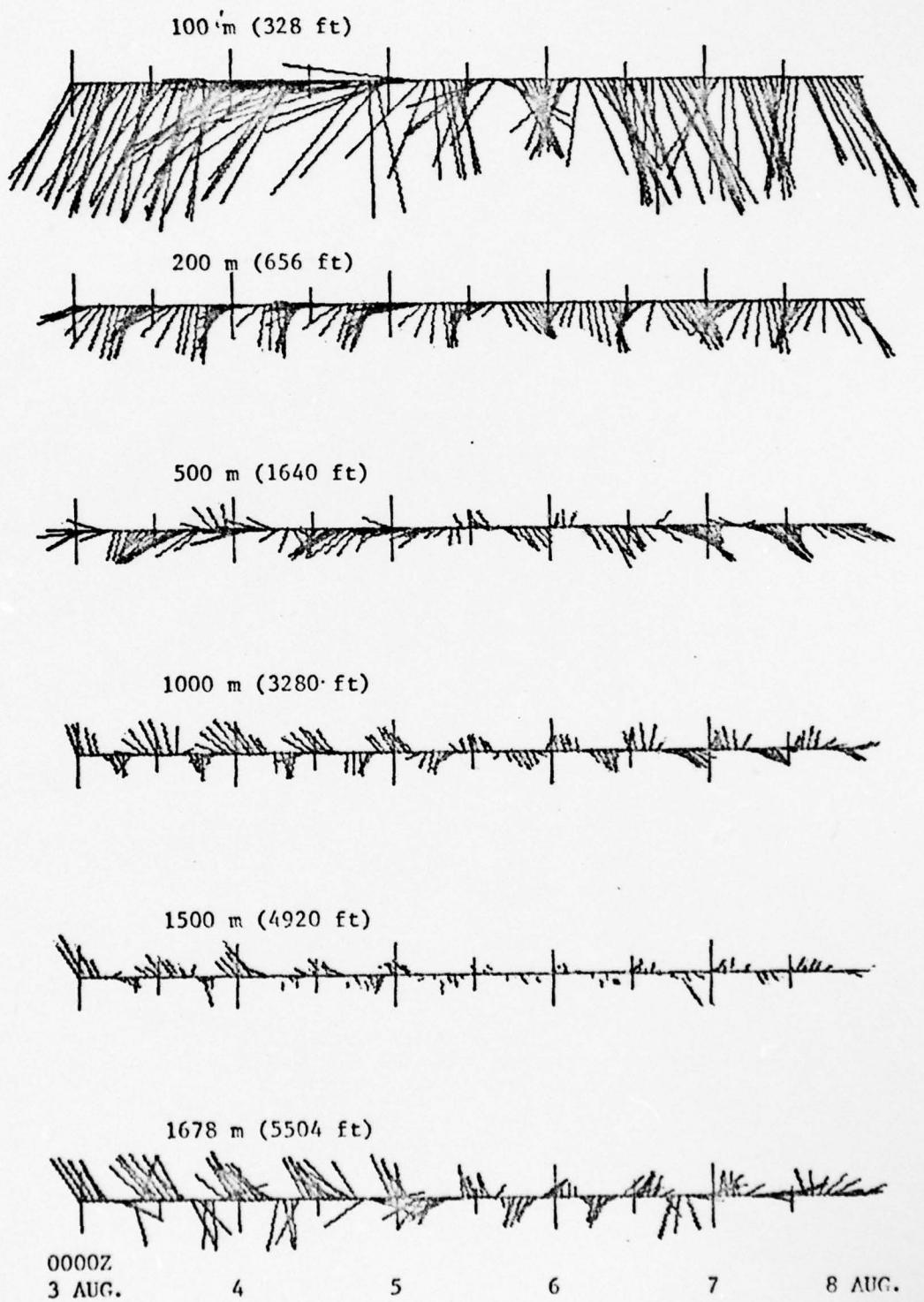
N-429	100
N-474	200
N-472	500
N-411	1000
N-466	1500
N-417	1678

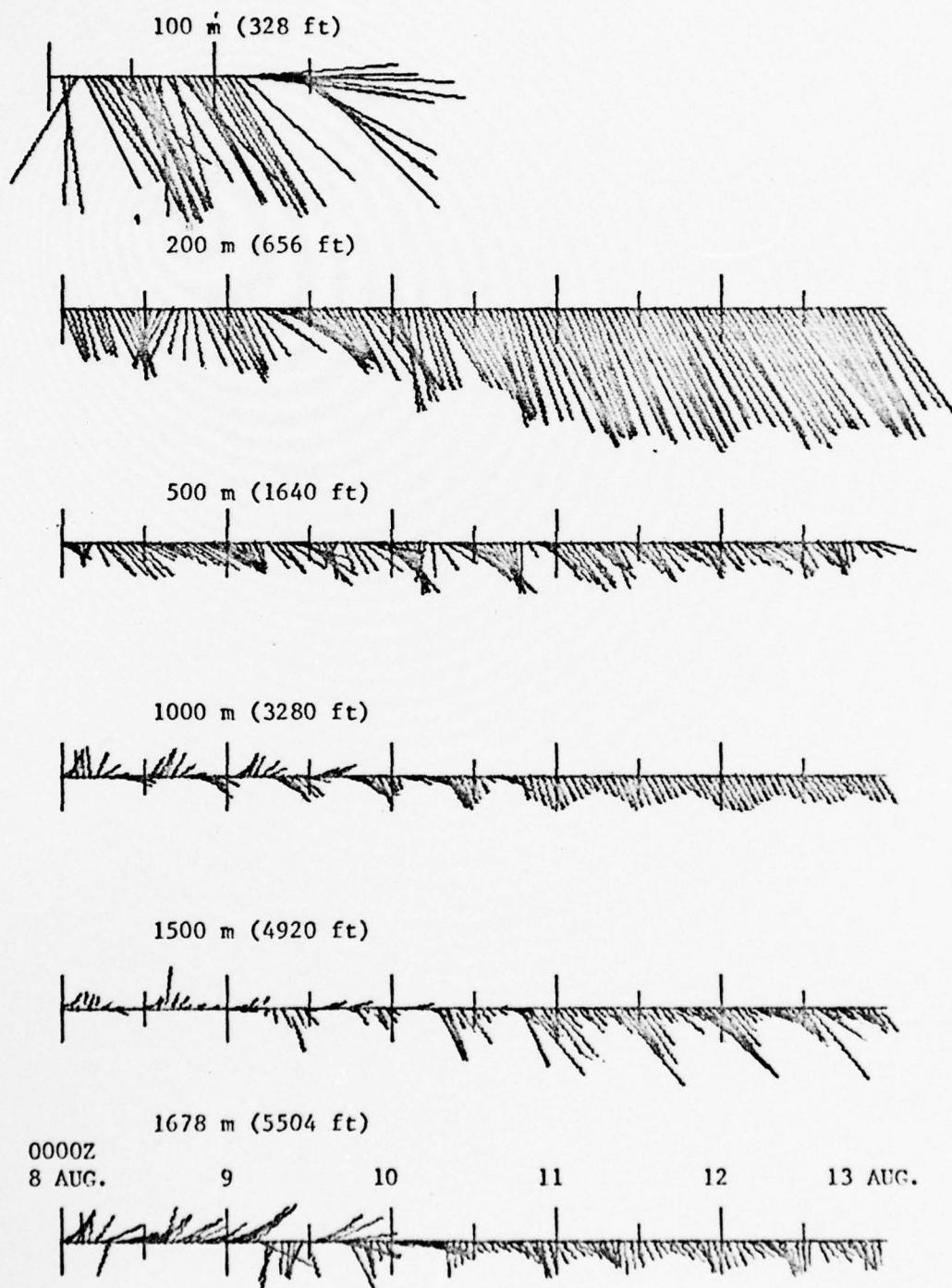
SCALE = 25 CM/SEC PER CM 

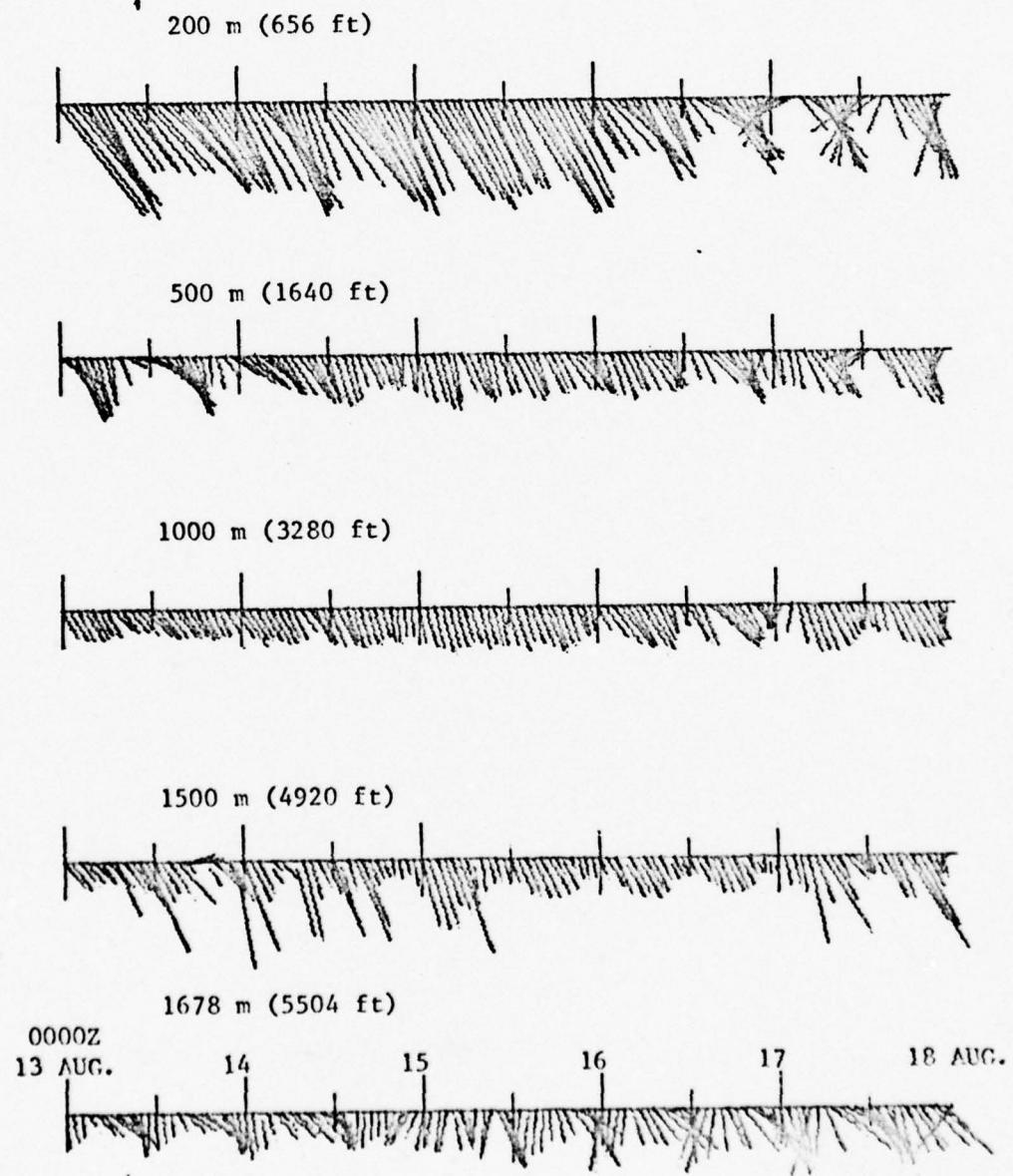












200 m (656 ft)



500 m (1640 ft)



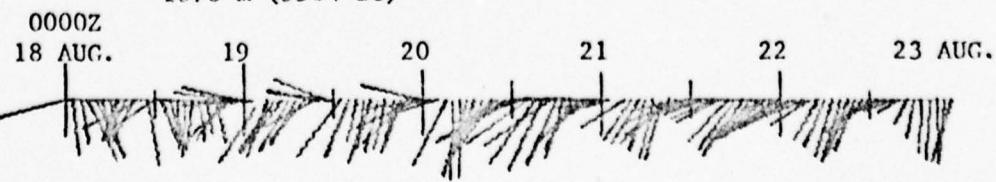
1000 m (3280 ft)



1500 m (4920 ft)



1678 m (5504 ft)



0000Z

18 AUG.

19

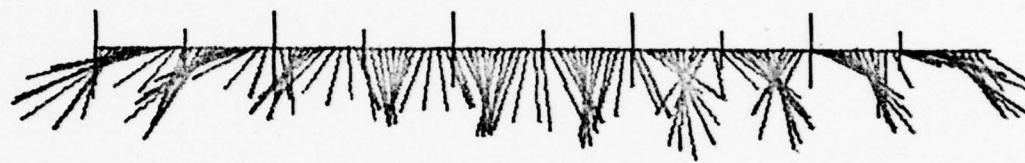
20

21

22

23 AUG.

200 m (656 ft)



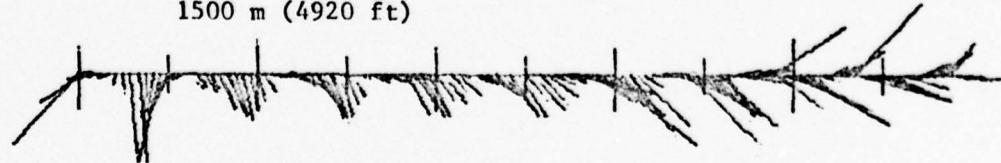
500 m (1640 ft)



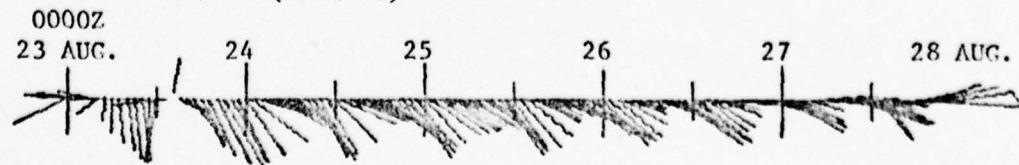
1000 m (3280 ft)



1500 m (4920 ft)



1678 m (5504 ft)



200 m (656 ft)



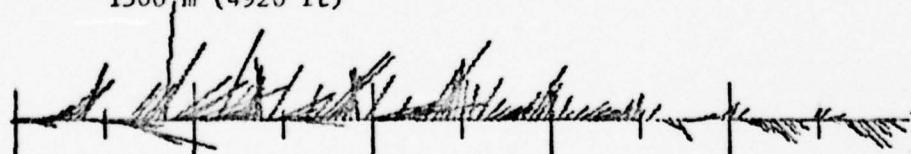
500 m (1640 ft)



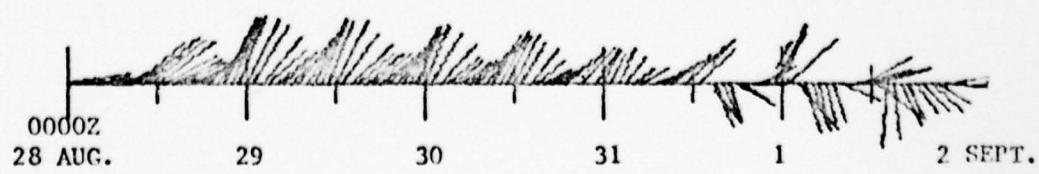
1000 m (3280 ft)



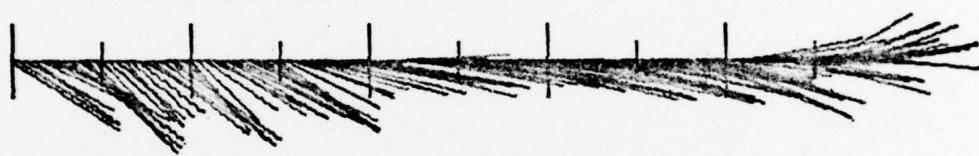
1500 m (4920 ft)



1678 m (5504 ft)



200 m (656 ft)



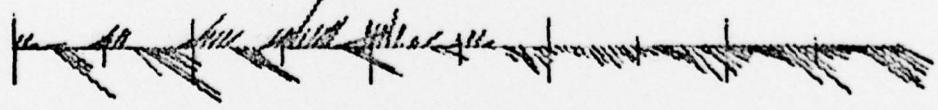
500 m (1640 ft)



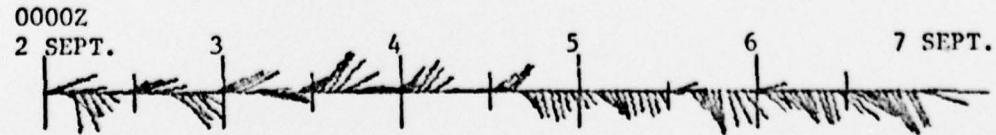
1000 m (3280 ft)



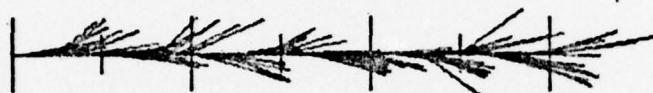
1500 m (4920 ft)



1678 m (5504 ft)



200 m (656 ft)



500 m (1640 ft)



1000 m (3280 ft)



1500 m (4920 ft)



1678 m (5504 ft)



WILKES NORW SEA JULY-SEPT 1974

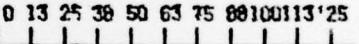
WATER DEPTH = 1960 METERS

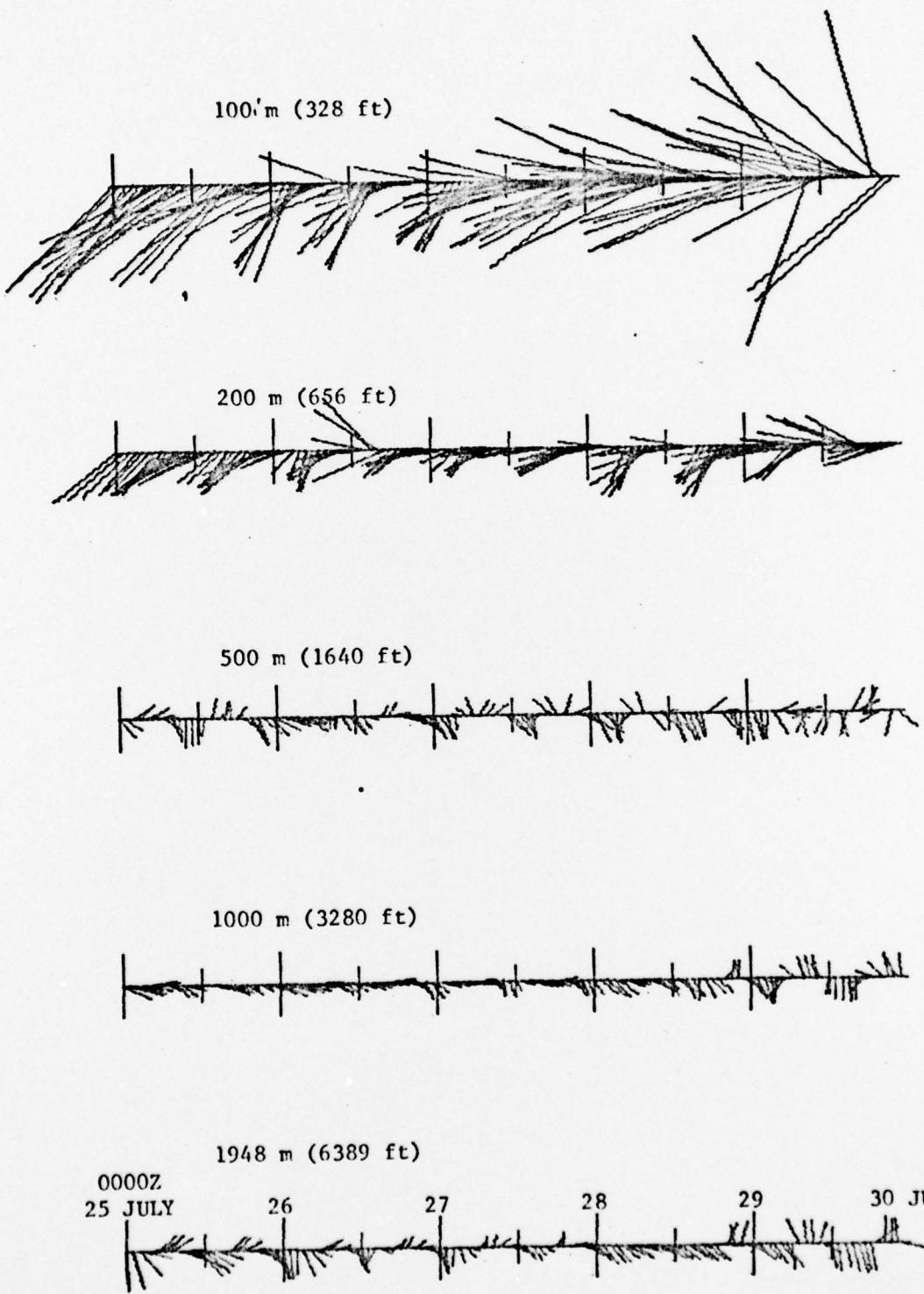
ARRAY *2* HOUR AVERAGES

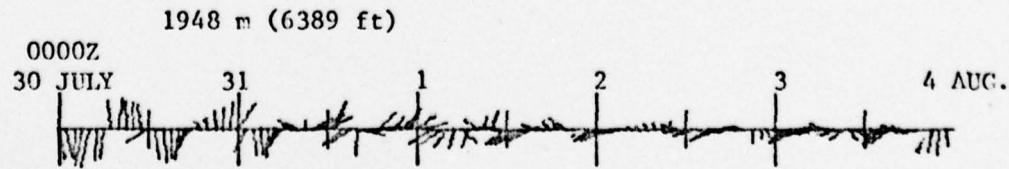
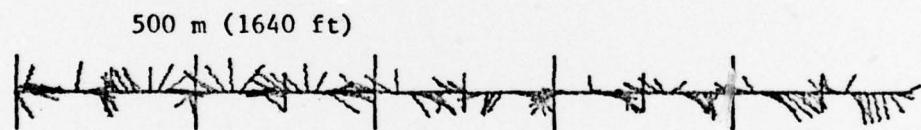
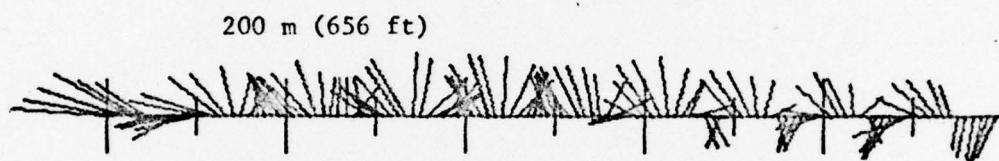
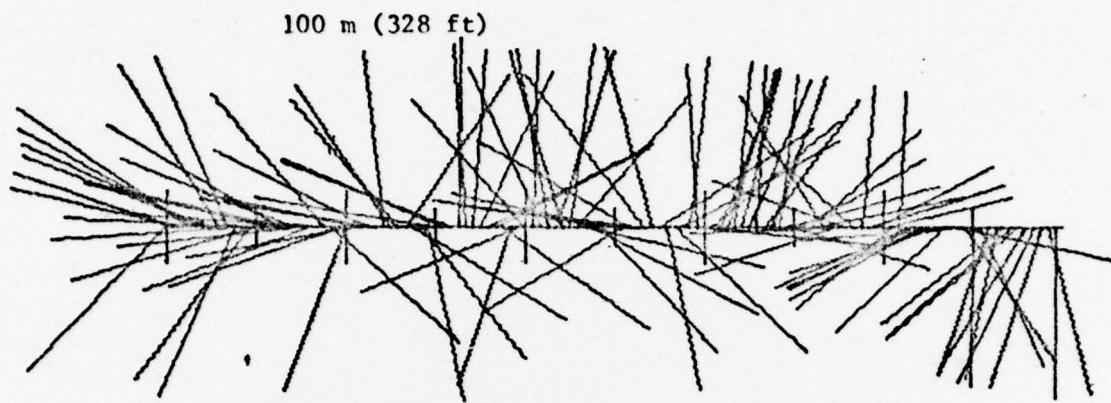
CURRENT METER DEPTH - METERS

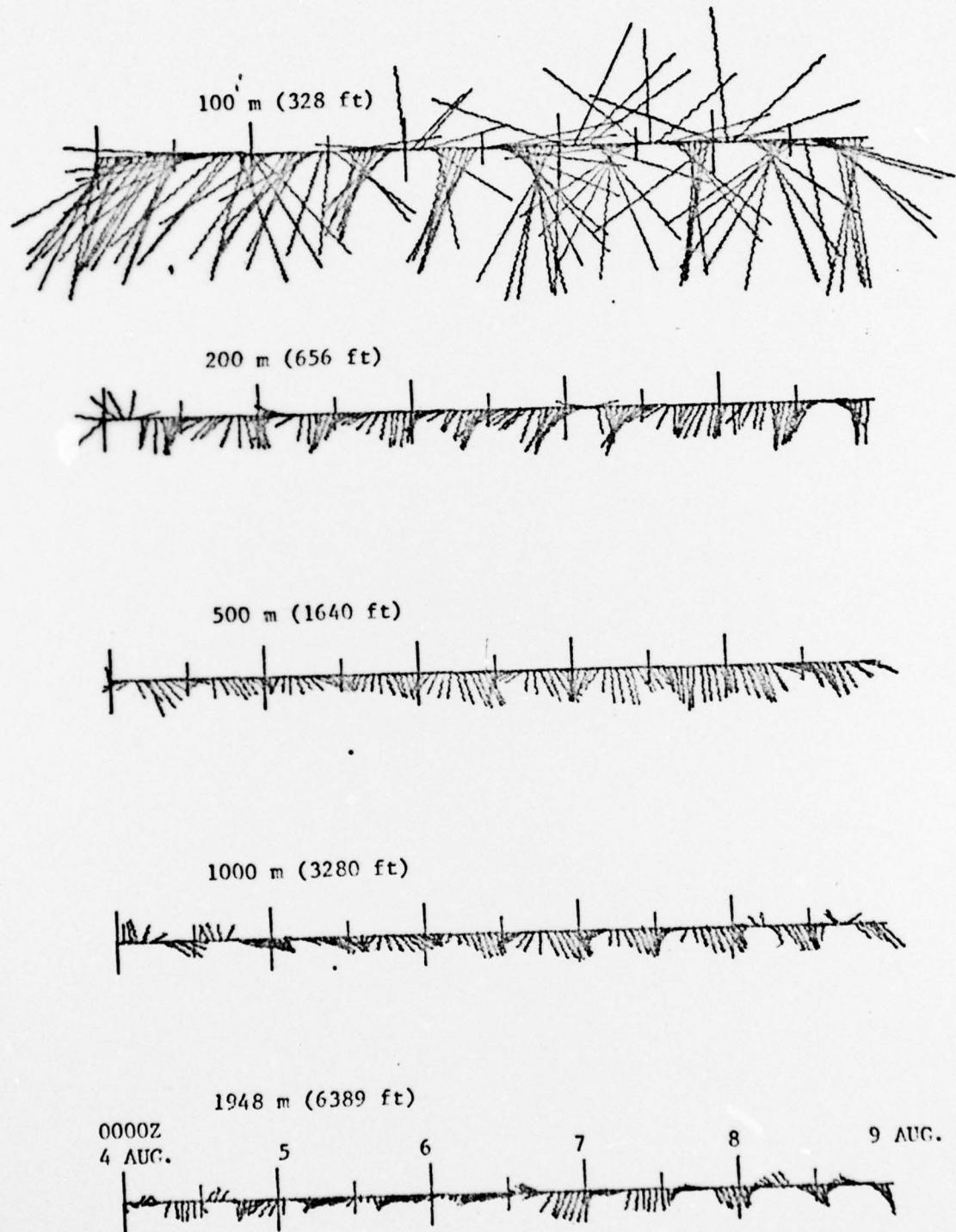
N-467	100
N-400	200
N-492	500
N-487	1000
N-491	1948

SCALE = 25 CM/SEC PER CM

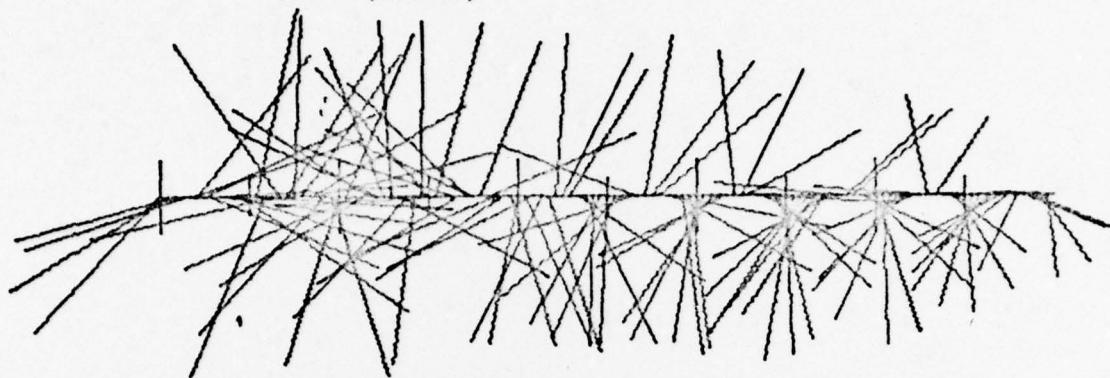








100 m (328 ft)



200 m (656 ft)



500 m (1640 ft)



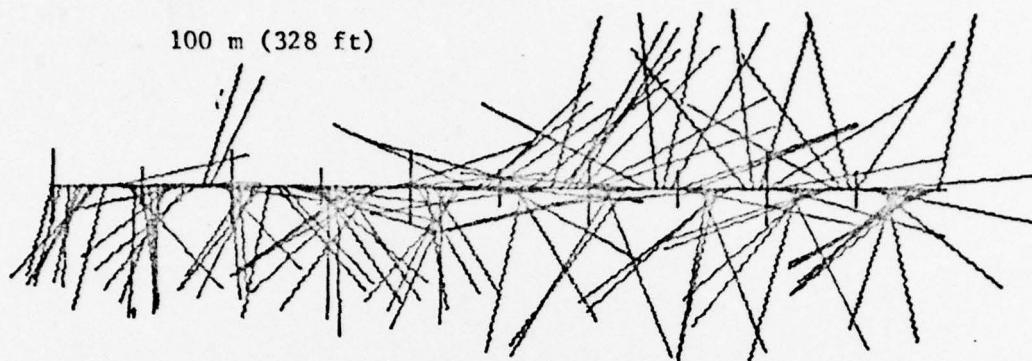
1000 m (3280 ft)



1948 m (6389 ft)



100 m (328 ft)



200 m (656 ft)



500 m (1640 ft)



1000 m (3280 ft)



1948 m (6389 ft)

0000Z

14 AUG.

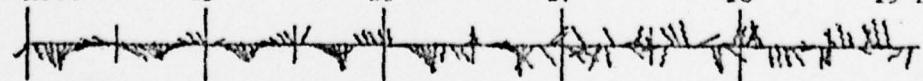
15

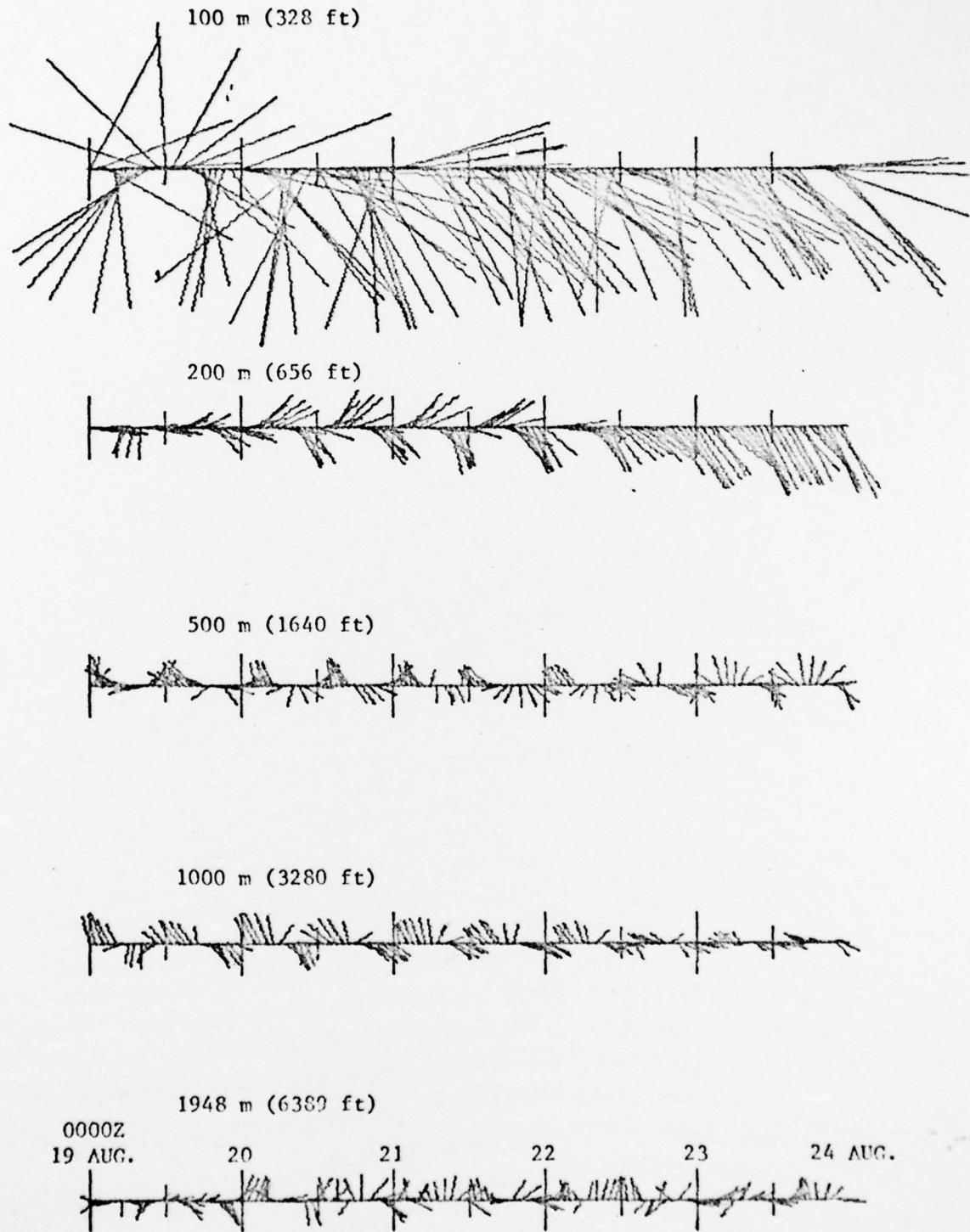
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17

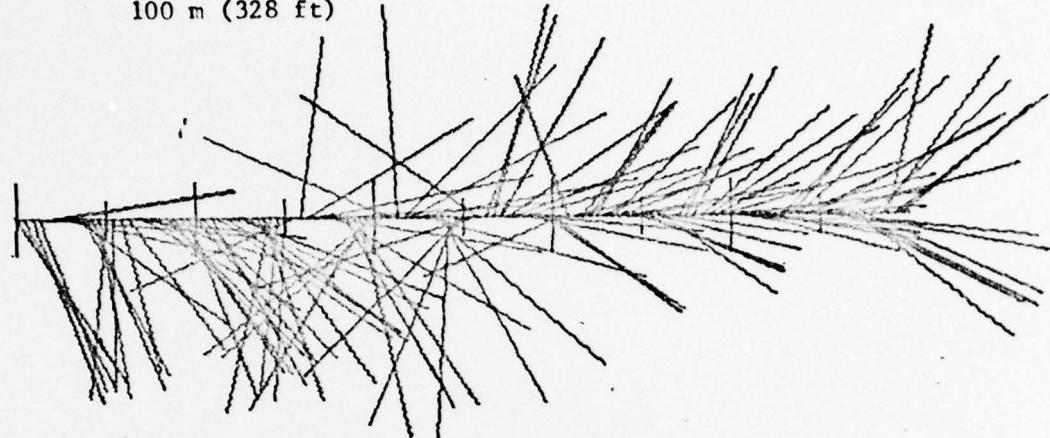
18

19 AUG.





100 m (328 ft)



200 m (656 ft)



500 m (1640 ft)



1000 m (3280 ft)

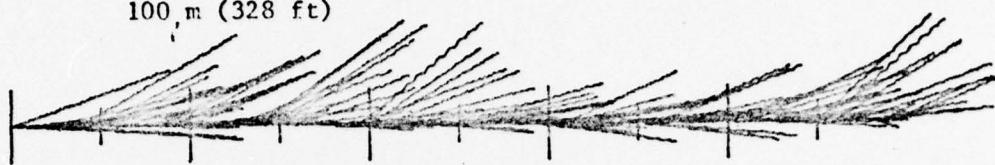


1948 m (6389 ft)

0000Z 24 AUG. 25 26 27 28 29 AUG.



100 m (328 ft)



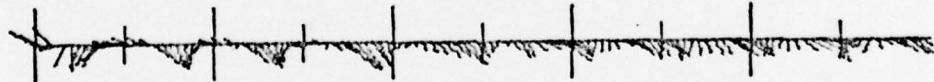
200 m (656 ft)



500 m (1640 ft)



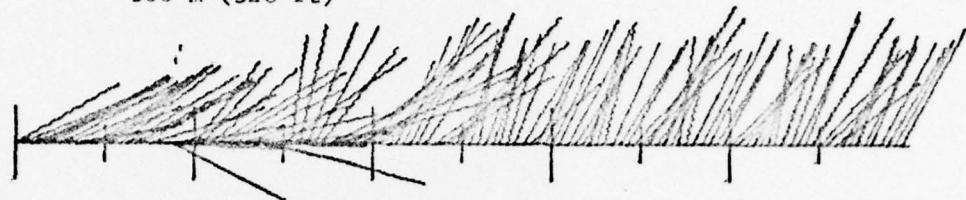
1000 m (3280 ft)



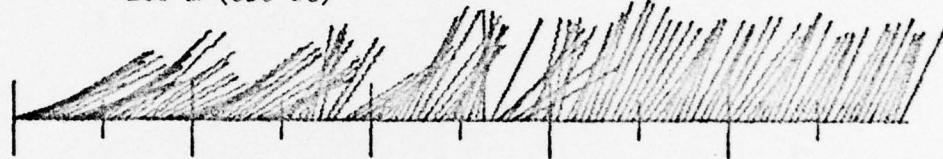
1948 m (6389 ft)



100 m (328 ft)



200 m (656 ft)



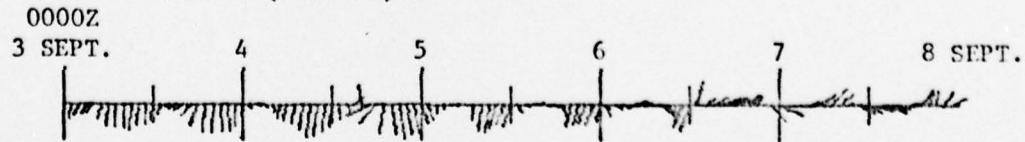
500 m (1640 ft)



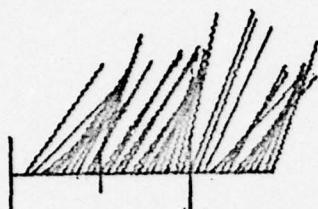
1000 m (3280 ft)



1948 m (6389 ft)



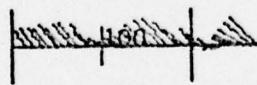
100 m (328 ft)



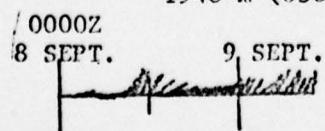
200 m (656 ft)



1000 m (3280 ft)



1948 m (6389 ft)



DISTRIBUTION LIST

NAVOCEANO TECH. NOTE
NO. 6110-2-75

DATE: APRIL 1975

SUBJECT: Results of Current Observations WILKES Norwegian Sea Operations
(Arrays 1 and 2)

NAVOCEANO TECHNICAL NOTE NO. 6110-2-75
(SUPPLEMENT)

REMARKS: